

REMARKS/ARGUMENTS

Favorable reconsideration of this application in view of the above amendments and in light of the following discussion is respectfully requested.

Claims 1-91 are pending. Claims 1, 2, 6, 8, 11, 13, 14, 18, 20, 23, 25, 26, 30, 32, 35, 37, 38, 40, 42, 44, 47, 49, 50, 52, 53, 56, 57, 59-61, 63, 64, 67, 68, 70-72, 74, 77, 78, 80-82, 84, 85, 88, 89, and 91 are amended, and Claims 92-130 are canceled without prejudice or disclaimer. No new matter is introduced.¹

In the outstanding Office Action, Claims 6, 11, 42, 47, 67, and 77 were rejected under 35 U.S.C. § 112, second paragraph as indefinite. In addition, Claims 1-3, 8, 37-39, 44, 60, 71, and 81 were rejected under 35 U.S.C. § 103(a) as unpatentable over Sonehara (U.S. Patent No. 6,388,697) in view of Shimada (U.S. Patent No. 4,760,251); Claims 4, 5, 40, and 41 were rejected under 35 U.S.C. § 103(a) as unpatentable over Sonehara in view of Shimada and Ouchi (U.S. Patent Publication No. 2002/0191230); Claims 9 and 45 were rejected under 35 U.S.C. § 103(a) as unpatentable over Sonehara and Shimada in view of Plesko (U.S. Patent No. 5,596,442); Claims 10 and 46 were rejected under 35 U.S.C. § 103(a) as unpatentable over Sonehara in view of Shimada, Plesko, and Ouchi; Claims 7 and 43 were rejected under 35 U.S.C. § 103 (a) as unpatentable over Sonehara and Shimada in view of Ouchi and Konno (U.S. Patent No. 5,767,955); Claims 11, 13-36, and 48 were rejected under 35 U.S.C. § 103 (a) as unpatentable over Sonehara and Shimada in view of Plesko and Konno; Claims 49, 51-58, and 59 were rejected under 35 U.S.C. § 103 (a) as unpatentable over Nakajima (U.S. Patent Publication No. 2001/0035460) in view of Sonehara and Shimada; Claim 50 was rejected under 35 U.S.C. § 103 (a) as unpatentable over Nakajima in view of Sonehara, Shimada, and Bobba (U.S. Patent No. 5,007,691); Claims 61, 72, and 82 were rejected under 35 U.S.C. § 103 (a) as unpatentable over Sonehara and Shimada in view

¹ See the claims as originally filed and the specification as originally filed at page 54, line 14 to page 55, line 17.

of Bobba; and Claims 62-66, 68-70, 73-76, 80, 83-90 were rejected under 35 U.S.C. § 103 (a) as unpatentable over Sonehara and Shimada in view of Bobba and Nakajima.

In response to the Restriction Requirement being maintained, Claims 92-130, directed to non-elected inventions, are canceled. Applicant reserves the right to present claims directed to the non-elected inventions in a divisional application, which shall be subject to the third sentence of 35 U.S.C. § 121.²

The outstanding Office Action rejected Claims 6, 11, 42 and 47 as indefinite, asserting that "Applicant has not clearly shown how the light-emission source inhibits image writing before a predetermined signal values." Amended Claims 6, 11, 18, 23, 30, 35, 42, and 47 clarify that the light-emission source is inhibited from starting image writing before the predetermined detection signal value is obtained in the detection part. Claims 67 and 77 were also rejected as indefinite. In rejecting these claims, the outstanding Office Action asserts that "Applicant has not clearly shown how... a reference signal for starting image writing is switched." Amended Claims 56, 67, 77, and 88 clarify that one of a plurality of detection signals output from the beam detection part is selected as a reference signal for starting image writing in accordance with an on-off timing of the driving voltages applied to said movable mirror driving part. In view of these amendments, it is submitted that all of the claims are definite and clear. Accordingly, it is respectfully requested that the rejection of Claims 6, 11, 42 and 47 under 35 U.S.C. § 112, second paragraph be withdrawn.

It is respectfully requested that the rejection of Claims 1-3, 8, 37-39, 44, 60, 71, and 81 under 35 U.S.C. § 103(a) as unpatentable over Sonehara in view of Shimada be withdrawn for at least the reasons discussed next.

² "A patent issuing on an application with respect to which a requirement for restriction under this section has been made ... shall not be used as a reference ... against a divisional application." See also MPEP 804.01.

Independent Claims 1, 37, 60, 71, and 81 each recite, *inter alia*:

a light-emission source configured to emit a light beam;
a movable mirror configured to reflect the light beam, *the
movable mirror being swingably supported by a rotary shaft*; and
a movable mirror driving part that is configured to cause
said movable mirror *to oscillate in first and second opposite
directions*

Turning to the applied references, Sonehara relates to a two-dimensional optical scanning device. Figure 4 of Sonehara illustrates a two-dimensional optical scanner that includes synchronous detector 402, a photodetector 401, and a control circuit 403.³ Sonehara describes that scanning signals are transmitted to a linear movable mirror driving unit 404 in synchronization with two synchronous signals 409 from detectors 401 and 402.⁴ A light valve is disposed on a plane 416 to be scanned by a beam from a moving mirror 415.⁵ Figure 4 of Sonehara further illustrates a pre-objective scanning optical system in which a rotating polygon-mirror deflector 412 is positioned on the side of a light source with respect to the condensing lens group 411.⁶ However, Sonehara fails to disclose or suggest a movable mirror driving part that is configured to cause the claimed movable mirror to *oscillate in first and second opposite directions*.

The outstanding Office Action identifies the linear movable mirror driving unit 404 of Sonehara as the claimed driving part.⁷ However, the movable mirror driving unit 404 does not cause the moving mirror to *oscillate in first and second opposite directions*. Instead, the Sonehara merely describes “a linear movable mirror 305 which moves in the direction of the optical axis of a lens 301 within the horizontal polarization plane.”⁸ Thus, the Office Action appears to assert that the motion of the mirror 305 is inherently oscillatory.

³ See Sonehara, at col. 6, lines 41-45.

⁴ See Sonehara, at col. 6, lines 48-50.

⁵ See Sonehara, at col. 6, lines 54-56.

⁶ See Sonehara, at col. 6, lines 58-61.

⁷ See the outstanding Office Action at page 2.

⁸ See Sonehara, at col. 6, lines 17-20.

As such, the inherency assertion of the Official Action is incorrect and unsupported. The fact that linear movable mirror 305 moves in the direction of the optical axis of a lens 301 within the horizontal polarization plane does not *necessarily* demonstrate that movable mirror driving unit 404 is configured to cause the claimed movable mirror to *oscillate in first and second opposite directions*, as recited in amended Claim 1. “To establish inherency, the extrinsic evidence ‘must make clear that the missing descriptive matter is *necessarily* present in the thing described in the reference, and that it would be so recognized by persons of ordinary skill. Inherency, however, may *not* be established by probabilities or possibilities. The mere fact that a certain thing may result from a given set of circumstances is not sufficient.’” *In re Robertson*, 169 F.3d 743, 745, 49 USPQ2d 1949, 1950-51 (Fed. Cir. 1999) (emphasis added) (citation omitted) (quoting *Continental Can Co. USA, Inc. v. Monsanto Co.*, 948 F.2d 1264, 1268, 20 USPQ2d 1746, 1749 (Fed. Cir. 1991)). The Office Action provides no such factual basis or technical reasoning, thus the rejection based on Sonehara is improper and should be withdrawn.

Further, even if the mirror driving unit is interpreted as causing the moving mirror 415 to oscillate, the moving mirror is not the claimed movable mirror that is *swingably supported by a rotary shaft*. Instead, Sonehara describes that the movable mirror 305 is a *linear* movable mirror. Indeed, Sonehara describes that the “means for moving the linear movable mirror in this embodiment involves the use of a servo motor 309 including a highly accurate *cross roller table and a ball screw* joined thereto.”⁹ A *linear* movable mirror that is moved by a *cross roller table and a ball screw* is not a movable mirror that is *swingably supported by a rotary shaft*.

Shimada fails to cure the deficiencies in Sonehara. Shimada relates to an optical scanning apparatus. Figure 3 of Shimada illustrates an optical scanning apparatus in which a

⁹ See Sonehara, at col. 6, lines 20-23.

light beam L is deflected at a constant angular velocity by a rotating polygonal mirror 32, and converged by a condenser lens 34 onto the surface of a photoconductive photosensitive body 30.¹⁰ However, Shimada does not disclose or suggest that the polygonal mirror 32 is *swingably supported by a rotary shaft*, or a movable mirror driving part that is configured to cause the polygonal mirror 32 to *oscillate in first and second opposite directions*.

Claim 37 recites features that are not disclosed or rendered obvious by the combined teachings of Sonehara and Shimada. In particular, Claim 37 recites that a light emission period forming one pixel on a scanned surface is varied with respect to a primary scanning direction to be *minimized in a vicinity of a center of an image* so that a light-emission interval between each of pixels forming pixel information is *minimized in the vicinity of the center of the image*. Shimada, by contrast, describes the *opposite* configuration. In particular, Figures 4 and 10 of Shimada illustrate that a clock frequency f_k corresponding to each pixel is varied along a scanning direction so that the clock frequency f_k is low in the center and high at the end. This configuration drives a light source so that the light emission interval is long in the center and shorter at the ends. Shimada describes that this clock frequency control is applied to a system with a beam deflected by a polygonal mirror without correcting scanning speed with a scanning lense (such as shown in Figure 9 of Shimada), and corresponds to a characteristic where scanning speed *increases* as it goes from the center toward the end on the scanned surface. Thus, Shimada describes a center-end frequency level relationship *opposite* to that recited in Claim 37.

Accordingly, even the combined teachings of Sonehara and Shimada fail to disclose or suggest the features of amended independent Claims 1, 37, 60, 71, and 81. It is submitted that Claim 1, 37, 60, 71, and 81 and the claims depending therefrom are in condition for allowance, and it is respectfully requested that the rejection of Claims 1-3, 8, 37-39, 44, 60,

¹⁰ See Shimada, at col. 1, lines 40-45.

71, and 81 under 35 U.S.C. § 103(a) as unpatentable over Sonehara in view of Shimada be withdrawn.

With respect to the rejection of dependent Claims 4, 5, 40, and 41 under 35 U.S.C. § 103(a) as unpatentable over Sonehara in view of Shimada and Ouchi, Ouchi fails to cure the deficiencies in the combination of Sonehara and Shimada discussed above with respect to independent Claims 1 and 37. Thus, Claims 4 and 5 are believed to be in condition for allowance for at least the same reasons as Claim 1, from which they depend; and Claims 40 and 41 are believed to be in condition for allowance for at least the same reasons as Claim 37, from which they depend. Accordingly, it is respectfully requested that the rejection of dependent Claims 4, 5, 40, and 41 under 35 U.S.C. § 103(a) as unpatentable over Sonehara in view of Shimada and Ouchi be withdrawn.

With respect to the rejection of dependent Claims 9 and 45 under 35 U.S.C. § 103(a) as unpatentable over Sonehara in view of Shimada and Plesko, Plesko fails to cure the deficiencies in the combination of Sonehara and Shimada discussed above with respect to independent Claims 1 and 37. Thus, Claim 9 is believed to be in condition for allowance for at least the same reasons as Claim 1, from which it depends; and Claim 45 is believed to be in condition for allowance for at least the same reasons as Claim 37, from which it depends. Accordingly, it is respectfully requested that the rejection of dependent Claims 9 and 45 under 35 U.S.C. § 103(a) as unpatentable over Sonehara in view of Shimada and Plesko be withdrawn.

With respect to the rejection of dependent Claims 10 and 46 under 35 U.S.C. § 103(a) as unpatentable over Sonehara in view of Shimada, Plesko, and Ouchi, Plesko, and Ouchi fail to cure the deficiencies in the combination of Sonehara and Shimada discussed above with respect to independent Claims 1 and 37. Thus, Claim 10 is believed to be in condition for allowance for at least the same reasons as Claim 1, from which it depends; and Claim 46 is

believed to be in condition for allowance for at least the same reasons as Claim 37, from which it depends. Accordingly, it is respectfully requested that the rejection of dependent Claims 10 and 46 under 35 U.S.C. § 103(a) as unpatentable over Sonehara in view of Shimada, Plesko, and Ouchi be withdrawn.

With respect to the rejection of dependent Claims 7 and 43 under 35 U.S.C. § 103(a) as unpatentable over Sonehara and Shimada in view of Ouchi and Konno, Ouchi and Konno fail to cure the deficiencies in the combination of Sonehara and Shimada discussed above with respect to independent Claims 1 and 37. Thus, Claim 7 is believed to be in condition for allowance for at least the same reasons as Claim 1, from which it depends; and Claim 43 is believed to be in condition for allowance for at least the same reasons as Claim 37, from which it depends. Accordingly, it is respectfully requested that the rejection of dependent Claims 7 and 43 under 35 U.S.C. § 103(a) as unpatentable over Sonehara and Shimada in view of Ouchi and Konno be withdrawn.

It is respectfully requested that the rejection of Claims 11, 13-36, and 48 under 35 U.S.C. § 103 (a) as unpatentable over Sonehara and Shimada in view of Plesko and Konno be withdrawn for at least the reasons discussed next.

Amended independent Claims 13 and 25 each recite, *inter alia*:

a light-emission source configured to emit a light beam;
a movable mirror configured to reflect the light beam, *the movable mirror being swingably supported by a rotary shaft*; and
a movable mirror driving part that is configured to cause said movable mirror *to oscillate in first and second opposite directions*

As discussed above, neither Sonehara and Shimada, either alone or in combination, disclose or suggest a *movable mirror being swingably supported by a rotary shaft*, or a movable mirror driving part that is configured to cause said movable mirror *to oscillate in first and second opposite directions*. Neither Plesko nor Konno, either alone or in combination, cure the deficiencies in the combination of Sonehara and Shimada.

In addition, Claim 25 recites features that are not disclosed or rendered obvious by the combined teachings of the cited references. Claim 25 recites a variable frequency setting part varying, in accordance with *an amplitude of said movable mirror*, a frequency causing said light-emission source to emit light based on pixel information. None of the cited references disclose or suggest the claimed movable mirror *having an amplitude*, much less a variable frequency setting part varying a frequency causing said light-emission source to emit light based on pixel information in accordance with *an amplitude of said movable mirror*.

Accordingly, even the combined teachings of Sonehara, Shimada, Plesko, and Konno fail to disclose or suggest the features of amended independent Claims 13 and 25. It is submitted that amended independent Claims 13 and 25 and the claims depending therefrom are in condition for allowance, and it is respectfully requested that the rejection of Claims 11, 13-36, and 48 under 35 U.S.C. § 103 (a) as unpatentable over Sonehara and Shimada in view of Plesko and Konno be withdrawn.

It is respectfully requested that the rejection of Claims 49, 51-58, and 59 under 35 U.S.C. § 103 (a) as unpatentable over Nakajima in view of Sonehara and Shimada be withdrawn for at least the reasons discussed next.

Amended independent Claim 49 recites, *inter alia*:

a light-emission source configured to emit a light beam;
a movable mirror configured to reflect the light beam, *the movable mirror being swingably supported by a rotary shaft*; and
a movable mirror driving part that is configured to cause said movable mirror *to oscillate in first and second opposite directions*

As discussed above, neither Sonehara and Shimada, either alone or in combination, disclose or suggest a *movable mirror being swingably supported by a rotary shaft*, or a movable mirror driving part that is configured to cause said movable mirror *to oscillate in first and second opposite directions*. Nakajima fails cure the deficiencies in the combination of Sonehara and Shimada.

Figure 11 of Nakajima illustrates a mirror 73 which is formed by etching to be shaft-supported by two twist beams 74.¹¹ Nakajima further describes that the mirror 73 can be swung about the twist beams 74 as rotation axes.¹² However, as can be seen in Figure 11 of Nakajima, the twist beams 74 and the mirror 73 are all an integral part of the substrate 71. Indeed, the *twist beams* 74 are merely narrow portions of the substrate 71 created by etching, and are not a *rotary shaft* that swingably supports a movable mirror, as presently claimed. Thus, Nakajima fails to cure the deficiencies in Sonehara and Shimada discussed above, and it is respectfully requested that the rejection of the rejection of Claims 49, 51-58, and 59 as unpatentable over Nakajima in view of Sonehara and Shimada be withdrawn.

With respect to the rejection of dependent Claim 50 under 35 U.S.C. § 103 (a) as unpatentable over Nakajima in view of Sonehara, Shimada, and Bobba, Bobba fails to cure the deficiencies in the combination of Nakajima, Sonehara and Shimada discussed above with respect to independent Claim 49. Thus, Claim 50 is believed to be in condition for allowance for at least the same reasons as Claim 49, from which it depends. Accordingly, it is respectfully requested that the rejection of dependent Claim 50 under 35 U.S.C. § 103 (a) as unpatentable over Nakajima in view of Sonehara, Shimada, and Bobba be withdrawn.

With respect to the rejection of dependent Claims 61, 72, and 82 under 35 U.S.C. § 103 (a) as unpatentable over Sonehara and Shimada in view of Bobba, Bobba fails to cure the deficiencies in the combination of Sonehara and Shimada discussed above with respect to independent Claims 60, 71, or 81. Thus, Claim 61 is believed to be in condition for allowance for at least the same reasons as Claim 60, from which it depends; Claim 72 is believed to be in condition for allowance for at least the same reasons as Claim 71, from which it depends; and Claim 82 is believed to be in condition for allowance for at least the same reasons as Claim 81, from which it depends. Accordingly, it is respectfully requested

¹¹ See Nakajima, at paragraph [0187].

¹² See Nakajima, at paragraph [0187].

that the rejection of dependent Claims 61, 72, and 82 under 35 U.S.C. § 103 (a) as unpatentable over Sonehara and Shimada in view of Bobba be withdrawn.

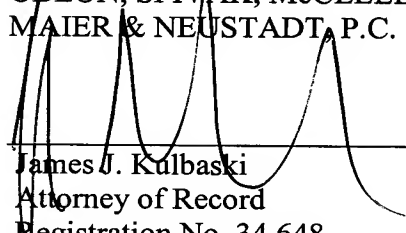
With respect to the rejection of dependent Claims 62-66, 68-70, 73-76, 80, 83-90 under 35 U.S.C. § 103 (a) as unpatentable over Sonehara and Shimada in view of Bobba and Nakajima, Bobba and Nakajima fail to cure the deficiencies in the combination of Sonehara and Shimada discussed above with respect to independent Claims 60, 71, or 81. Thus, Claims 62-66, 68-70 are believed to be in condition for allowance for at least the same reasons as Claim 60, from which they depend; Claims 73-76, 80 are believed to be in condition for allowance for at least the same reasons as Claim 71, from which they depend; and Claims 83-90 are believed to be in condition for allowance for at least the same reasons as Claim 81, from which they depend. Accordingly, it is respectfully requested that the rejection of dependent Claims 62-66, 68-70, 73-76, 80, 83-90 under 35 U.S.C. § 103 (a) as unpatentable over Sonehara and Shimada in view of Bobba and Nakajima.

For the reasons discussed above, no further issues are believed to be outstanding in the present application, and the present application is believed to be in condition for formal allowance. Therefore, a Notice of Allowance for Claims 1-91 is earnestly solicited.

Should the Examiner deem that any further action is necessary to place this application in even better form for allowance, the Examiner is encouraged to contact Applicant's undersigned representative at the below listed telephone number.

Respectfully submitted,

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